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| 10/771,719  | 02/03/2004  | Edward J. Simburger  | D-487               | 4138             |
| 7590  | 06/29/2007  |                      | EXAMINER            |                  |
| Ms. Carole A. Mulchinski<br>The Aerospace Corporation<br>2350 East El Segundo Boulevard<br>M1/040<br>El Segundo, CA 90245 |             |                      | TRINH, THANH TRUC   |                  |
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

| <b>Office Action Summary</b> | <b>Application No.</b> | <b>Applicant(s)</b> |
|------------------------------|------------------------|---------------------|
|                              | 10/771,719             | SIMBURGER ET AL.    |
| Examiner                     | Art Unit               |                     |
| Thanh-Truc Trinh             | 1753                   |                     |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

1)  Responsive to communication(s) filed on 03 February 2004.

2a)  This action is **FINAL**.                            2b)  This action is non-final.

3)  Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## **Disposition of Claims**

4)  Claim(s) 1-16 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.

5)  Claim(s) \_\_\_\_\_ is/are allowed.

6)  Claim(s) 1-16 is/are rejected.

7)  Claim(s) \_\_\_\_\_ is/are objected to.

8)  Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

9)  The specification is objected to by the Examiner.

10)  The drawing(s) filed on \_\_\_\_\_ is/are: a)  accepted or b)  objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)  The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)  Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a)  All    b)  Some \* c)  None of:  
1.  Certified copies of the priority documents have been received.  
2.  Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3.  Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a))

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1)  Notice of References Cited (PTO-892)  
2)  Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3)  Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date .

4)  Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_ .

5)  Notice of Informal Patent Application

6)  Other: \_\_\_\_ .

## **DETAILED ACTION**

### ***Specification***

The disclosure is objected to because of the following informalities:

Page 10 line 4, "insulting material" should be – insulating material –.

Appropriate correction is required.

### ***Claim Objections***

Claim 12 is objected to because of the following informalities:

Line 4, "a electrical contact" should be – an electrical contact –.

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

1. Claims 10-14 and 16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 10 and 11 are indefinite because claim 1, from which claims 10 and 11 depend, is not drawn to a "static electrical charge".

Claim 12 is indefinite because claim 1, from which claim 12 depends, is not drawn to anything that produce "power from the left panel".

Claim 13 recites the limitation "the position" in line 15. There is insufficient antecedent basis for this limitation in the claim.

Claim 14 recites the limitations of "the bladder" in line 24 and "the position" in line 26". There are insufficient antecedent basis for these limitation in the claim.

Claim 16 is recites the limitation "the angular position" in line 11. There is insufficient antecedent basis for this limitation in the claim.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

2. Claims 1-6, 10-11 and 13-16 are rejected under 35 U.S.C. 102(a) as being anticipated by Simburger et al. (44<sup>th</sup> AIAA/ASME/ASCE/AHS Structures, Structural Dynamics, and Material Conference)

Regarding claim 1, as seen in Figures 1-4, Simburger et al. disclose a hinge for positioning a left panel and a right panel. As seen in Figure 5, the hinge comprises an inflatable tubular bladder for encapsulating an inflation material; a top film extending between the left and right panels and encapsulating a curing resin; and a bottom film extending between the left and right panels. The top film and bottom film are

circumferentially disposed about the bladder. The top film has a top circumferential length, and the bottom film has a bottom circumferential length, wherein the top circumferential length is longer than the bottom circumferential length for angularly positioning the left and right panels. (See section titled "Multifunctional UV-Rigidizable Inflatable Hinge" on page 3)

Regarding claim 2, Simburger et al. describe a flex circuit which is integrated fully with the solar cells is incorporated into the hinge lay-up between the bladder and the bottom hinge (See page 3). It is the Examiner's position that the flex circuit is extended from the left panel (or the left solar panel) and around the bladder for electrically routing power from the left panel.

Regarding claim 3, Simburger et al. teach using an inflation material is a sublimation power disposed in the bladder for inflating the bladder. (See section titled "Inflation Material Trade Study" on pages 10 and 11)

Regarding claim 4, Simburger et al. disclose a reflective coating disposed on the bladder for reflective UV light into the curing resin. (See second paragraph of col. 2 on page 9)

Regarding claim 5, Simburger et al. disclose a left frame for securing the left panel to the top film and to the bottom film and to the bladder, and a right frame for securing the right panel to the top film and to the bottom film and to the bladder. (See second paragraph of col. 2 on page 3)

Regarding claim 6, Simburger et al. teach bonding the solar panel frames to the top, bottom layers and to the cylindrical portion of the bladder. (See Figures 1-5 and

second paragraph of col. 2 on page 3). It is the Examiner's position that there must be adhesive layers, left and right, for "bonding" and securing the left and right frames to the left and right panels, to the top and bottom films, and to the bladder.

Regarding claims 10-11, Simburger et al. teach coating a PowerSphere Assembly including the hinge with ITO MgF<sub>2</sub> (indium tin oxide and magnesium fluoride) to prevent damage due to electrical arcing. (See first paragraph of col. 1 on page 3). It is the Examiner's position that the Simburger et al. teach a coating of indium tin oxide and magnesium fluoride disposed over the top and bottom films for passing UV light and for conducting static electrical charge.

Regarding claims 13-15, as seen in Figures 1-5, Simburger et al. disclose a hinge for positioning a left panel and a right panel. The hinge comprises a top film for encapsulating a curing resin, wherein the curing resin cured by exposure to UV light; the top film having a top circumferential length for defining the position between the left and right panels; and a coating of indium tin oxide and magnesium fluoride; a bottom film, wherein the top and bottom films are circumferentially disposed about the bladder and the circumferential length of the top film is longer than that of the bottom film to define an angular position between the left and right panels. (See page 3, sections titled "UV Transparent Film Study and Testing" and "Inflation Material Trade Study"). The reference describes that the PowerSphere Assembly including the hinge is coated with transparent ITO/MgF<sub>2</sub> to prevent damage due to electrical arcing. (See first paragraph of col. 1 on page 3). Therefore, it is the Examiner's position that the coating of ITO/MgF<sub>2</sub> can pass UV light for curing the curing resin and for static discharge protection.

Regarding claim 16, as seen in Figures 1-5, Simburger et al. disclose a hinge for positioning a left panel and a right panel. The hinge comprises a curing resin, a top film coupled to the left and right panels and for encapsulating the curing resin. The curing resin is cured by exposure to UV light, the top film has a top circumferential length is longer for defining the angular position between the left and right panels. (See Figures 1-5, page 3 and sections titled “UV Transparent Film Study and Testing” and “Inflation Material Trade Study”).

3. Claims 1, 13-14 and 16 are rejected under 35 U.S.C. 102(b) as being anticipated by Wallsten (US Patent 3960386).

Regarding claim 1, as seen in Figures 1-2, 5 and 6, Wallsten discloses a hinge (or inflatable channel 2) for positioning a left and right panels (or walls 3) comprising a tube-like inflatable bladder (4) for encapsulating an inflation material; a top film (middle portion of panels 3) extending between the left and the right panels and encapsulating a resin 7, and a bottom film (6) extending between the left and right panels. The top film and bottom film are circumferentially disposed about the bladder. The top film has a circumferential length, the bottom film also has a circumferential length, wherein the top and circumferential lengths angularly position the left and right panels. Wallsten describes layer 7 is made of nylon. (See col. 5 lines 13-18). Therefore, it is the Examiner's position that nylon is a curing resin.

Regarding claims 13-14, as seen in Figures 1-2, 5 and 6, Wallsten discloses a hinge (inflatable channel 2) for positioning a left and right panels (walls 3). The hinge

Art Unit: 1753

comprises a top film (7) for encapsulating a curing resin (4), wherein the top film has a top circumferential length for defining the position between the left and right panels; a coating (a middle portion of wall 3) disposed over the top film; a bottom film (6) with a circumferential length, wherein the top and the bottom circumferential length defining the position between the left and right angle. The layer 4 can be made of PVC or polyethene... (See col. 8 lines 51-66). Therefore, it is the Examiner's position that the layer 4 is a curing resin. In addition, "curing resin cured by exposure to UV light" is a process-by-product limitation. The Examiner wants to point out that the patentability is based on the product, and not on the method of making such as how the resin is cured. (See MPEP § 2113). Wallsten describes the coating layer (or middle portion of wall 3) made of nylon (See col. 5 lines 15-20), therefore it is the Examiner's position that the coating can be transparent used for passing UV light and static discharge protection.

Regarding claim 16, as seen in Figures 1-2 and 5-6, Wallsten discloses a hinge (or channel 2) for positioning a left panel and a right panel (walls 3). The hinge comprises a curing resin (7); a top film (middle portion of panels 3) coupled to the left and right panels for encapsulating the curing resin (7). The top film has a top circumferential length for defining the angular position between the left and right panels.

Regarding the limitation of "the curing resin being cured by exposure to UV light", this is a product-by-process limitation, and the patentability is based on the product, not on the method of making such as how the resin is cured.

4. Claims 13-14 and 16 are rejected under 35 U.S.C. 102(b) as being anticipated by Kaji et al. (US Patent 5701067).

Regarding claim 13, as seen in Figures 11, Kaji et al. disclose a hinge (106) for positioning a left panel (101) and right panel (101). The hinge comprises a top film (102) for encapsulating a curing resin (epoxy), wherein the top film has a top circumferential length for defining the position between the left and right panels; and a coating (103) disposed over the top film. Kaji et al. describe the top film (102) is attached to the panels (solar cells) by conductive epoxy. (See col. 8 lines 21-29). It is the Examiner's position that the conductive epoxy is the curing resin. Kaji et al. teach the structural limitations of the instant claim, therefore the reference is deemed to anticipatory.

Regarding claim 14, Kaji et al. further describe the bottom film (103), wherein the top and bottom films are circumferentially disposed about the hinge. The top and bottom films have unequal length which defines the position between the left and right angle. (See Figure 11).

Regarding claim 16, as seen in Figure 11, Kaji et al. disclose a hinge (106) for positioning a left panel (101) and a right panel (101). The hinge comprises a curing resin (conductive epoxy – See col. 8 line 23), a top film (102) coupled to the left and right panels and for encapsulating the curing resin. The top film has a top circumferential length inherently for defining an angular position between the left and right panels. Kaji et al. teach all the structural limitations of the instant claim, therefore the reference is deemed to be anticipatory.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. Claims 7-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Simburger et al. (44<sup>th</sup> AIAA/ASME/ASCE/AHS Structures, Structural Dynamics, and Material Conference).

Regarding claims 7-8, Simburger et al. disclose hinge as described in paragraph 2, wherein a flex circuit is fully integrated on the back side of the solar cell for routing power supply to the spacecraft and incorporated into the hinge lay-up between the bladder and the bottom film of the hinge. (See last paragraph of col. 2 on page 2 and second paragraph of col. 2 on page 3). It is the Examiner's position that the ground pads must be disposed under the left and right panels for routing power supply, since the integration of the flex circuit is on the backside of solar cell.

Simburger et al. do not specifically teach that the flex circuit extends from the left and around the bladder, nor do they teach having a plurality of ground pads disposed on the top and bottom films and a plurality of extensions comprising conductive traces extending from the flex circuit to the plurality of the ground pads. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided the flex circuit extending from the left panel and around the bladder, a plurality of ground pads and a plurality of extensions comprising conductive traces extending from the flex circuit to the ground pads, because, in order to complete the circuit the flex circuit must have ground pads for grounding the hinge, and in order to route power supply from the solar cells the flex circuit must be extended with plurality of extension comprising conductive traces from the panels and around the bladder, since the circuit is incorporated between the bladder and the bottom film. Further, the location of the ground pads, either on top or bottom films, is a designer choice.

6. Claims 9 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Simburger et al. (44<sup>th</sup> AIAA/ASME/ASCE/AHS Structures, Structural Dynamics, and Material Conference) in view of Amick et al. (US Patent 5320684).

Regarding claim 9, Simburger et al. disclose a hinge as described in paragraph 2, wherein a flex circuit is fully integrated on the back side of the solar cell panels for routing power supply to the spacecraft and incorporated into the hinge lay-up between the bladder and the bottom film of the hinge. (See last paragraph of col. 2 on page 2 and second paragraph of col. 2 on page 3). In other words, Simburger et al. teach the

flex circuit extending from the left panel and around the bladder for electrically routing the power from the left or right panels.

Simburger et al. do not specifically teach the solar cell panel comprising a silver contact and a thin film solar cell, nor do they teach the flex circuit comprising a conductor trace connected the silver contact.

Minahan et al. teach using solar cell panel with silver contact (38) on a solar cell with various dimensions. (See col. 3 lines 4-6 and col. 5 lines 37-48)

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the hinge of Simburger et al. by using silver contact as taught by Minahan et al., because it would improve electrical conduction.

It would certainly obvious to one having ordinary skill in the art at the time the invention was made to have the solar cell panel comprising a thin film solar cell, because Minahan et al. teach that the solar cell can have various dimensions.

Regarding claim 12, Simburger et al. disclose a hinge as described in paragraph 2, wherein a flex circuit is fully integrated on the back side of the solar cell panels for routing power supply to the spacecraft and incorporated into the hinge lay-up between the bladder and the bottom film of the hinge. (See last paragraph of col. 2 on page 2 and second paragraph of col. 2 on page 3). In other words, Simburger et al. teach a flex circuit extending from the left panel and around a bladder. And in order to complete the circuit, the flex circuit inherently comprises a trace conductor for electrically routing power from the left panel having electrical contact an around the bladder.

Simburger et al. do not specifically teach a wrap around contact (40).

Minahan et al. teach using a wrap around contact. (See col. 5 lines 37-48).

It would have been obvious to one having ordinary skill at the time the invention was made to modify the hinge of Simburger et al. by using a wrap around contact as taught by Minahan et al., because it would improve surface efficiency. (See col. 1 lines 41-63)

7. Claims 2 and 4-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wallsten (US Patent 3960386) in view of Kaji et al. (US Patent 5701067)

Wallsten discloses a hinge as described in paragraph 3.

Wallsteen does not teach using a flex circuit, a left frame with adhesive, a right frame with adhesive. Nor do they teach a coating disposed over the top and bottom films.

Regarding claim 2, as seen in Figures 12 and 13, Kaji et al. teach using a flex circuit (metal leads 122) extending from the left panel and around the pivot 128 for electrically routing power from the left panel.

Regarding claim 4, as seen in Figure 13, Kaji et al. teach using a silver layer (122) disposed on the pivot 128. (See col. 8 lines 25-26). It is the Examiner's position that silver layer can reflect UV light.

Regarding claims 5-6, as seen in Figure 13, Kaji et al. describe the solar cell unit (121) attached to the hinge (126) and specifically to the pivot (128) by using adhesive layers 1210, and each solar cell unit has a substrate at the bottom and collector

electrode on top to support the solar cell. (See col. 7 lines 61-67 bridging col. 8 lines 129). It is the Examiner's position that the substrate and the collecting electrodes together constitute the frame for supporting and securing the left panel to the top film and to the hinge (or pivot 128).

Regarding claim 7, as seen in Figures 10-13, Kaji et al. further teach the hinge comprising a flex circuit (leads 122) extending from the left panel and around the pivot 128 for electrically routing power from the left panel, a plurality of ground pads (metal contact – See col. 8 lines 19-20), a plurality of extensions comprising conductive traces (122) extending from the flex circuit to the plurality of ground pads.

Regarding claim 8, as seen in Figure 13, Raji et al. disclose a flex circuit (122) extending from the left panel and around the hinge for electrically routing power from the left panel, a plurality of ground pads (collector electrodes and metal layer – See col. 8. lines 7-29) disposed on the bottom films and disposed on and under the left and right panels, and a plurality of extensions comprising conductive traces extending from the flex circuit to the plurality of ground pads.

Regarding claim 9, Raji et al. disclose a flex circuit (122) extending from the left panel and around the hinge for electrically routing power from the left panel, the left panel being a solar cell panel comprising a silver contact (See col. 8 lines 7-29) and a thin film solar cell (See col. 7 lines 61-67). The flex circuit comprises a conductor trace (122) connected the silver contact for routing power from the left panel and around the hinge. (See Figure 13).

Art Unit: 1753

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the hinge of Wallsten by providing the panels with solar panels and utilizing a flex circuit with conductors, ground pads, silver contact as taught by Raji et al., because it would give a flexible solar cell apparatus. (See col. 3 lines 24-25)

As relevant to claims 7 and 8, it would certainly have been obvious to a skilled artisan that the location of the ground pads, either on top or bottom films, is a designer choice.

8. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wallsten (US Patent 3960386) in view of A. D. Struble Jr. (US Patent 3277479)

Regarding claim 3, Wallsten discloses a hinge as described in paragraph 3.

Wallsten does not teach that the inflation material is a sublimation powder disposed in the bladder for inflating the bladder.

A.D. Struble Jr. teaches using a sublimation powder (14) disposed in the bladder for inflating the bladder. (See '479 Figure 4 and col. 3 line 49).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device of Wallsten by using sublimation powder as taught by A. D. Struble Jr., because it would reduce weight and be more reliable. (See col. 1 lines 42-45)

9. Claims 10-11 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wallsten (US Patent 3960386) in view of Dever et al. ("Indium Tin Oxide-Magnesium Fluoride Co-Deposited Films for Spacecraft Applications", International Conference on Metallurgical Coating and Thin Films, August – 1998).

Regarding claims 10-11 and 15, Wallsten teaches a hinge as described in paragraph 3, wherein the coating layer made of nylon can be transparent and passing UV light.

Wallsten does not teach the coating made of indium tin oxide and magnesium fluoride and conducting static electrical charge.

Dever et al. teach coating indium tin oxide and magnesium fluoride on the surface of a spacecraft for passing UV light and conducting static electrical charge. (See the Introduction).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the hinge of Wallsten by providing a coating layer of indium tin oxide and magnesium fluoride as taught by Dever et al., because it would prevent arcing. (See the Conclusion)

10. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wallsten (US Patent 3960386) in view of Kaji et al. (US Patent 5701067) and further in view of Minahan et al. (US Patent 4610077).

Wallsten discloses a hinge as described in paragraph 3.

Wallsten does not teach a flex circuit and a wrap around contact.

Kaji et al. teach using a flex circuit (122) extending from the left panel and around the pivot 128 (or bladder of the hinge) and comprising a trace conductor (122) for electrically routing power from the left panel having an electrical contact (electrodes) and around the bladder (or the pivot 128). (See Figure 13 and col. 8 lines 7-29 of Kaji et al.).

Minahan et al. teach using a solar cell having a wrap around contact. (See the Abstract and Figure 1k of Minahan et al.)

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device of Wallsten by providing a flex circuit as taught by Kaji et al. and a wrap around contact as taught by Minahan et al., because a flex circuit would provide a flexible leads connecting solar cells (See '067 col. 3 lines 24-49) and a wrap around contact would improve surface efficiency. (See '077 col. 1 lines 41-63)

11. Claims 1-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kaji et al. (US Patent 5701067) in view of A. D. Struble Jr. (US Patent 3277479).

As seen in Figures 10-13, Kaji et al. disclose a hinge 126 for position a left panel and a right panel. The hinge comprises a pivot (128); top film (top 1210) extending between the left and right panels and encapsulate a curing resin (pivot 128 can be made of plastic, a curing resin – See col. 9 lines 4-5); a bottom film (122, See col. 8 lines 25-26) extending between the left and right panels. The top film and the bottom film are circumferentially disposed about the pivot, the top film having a top

circumferential length, the bottom film having a bottom circumferential length. The top and the bottom circumferential lengths are for angularly positioning the left and right panels.

Kaji et al. do not teach an inflatable bladder for encapsulating an inflation material, nor do they teach using sublimation powder and reflective coating.

Regarding claim 1, A.D. Struble Jr. teaches using an inflatable bladder (or an inflatable tube 10) for encapsulating an inflation material 14. (See Figures 2-4)

Regarding claim 3, A. D. Struble Jr. teaches the inflation material is a sublimation powder disposed in the bladder for inflating the bladder. (See '479, Figures 2-4 and col. 3 line 49)

Regarding claim 4, A. D. Struble Jr. teaches coating the bladder (or inflatable tube 10) with aluminum. (See '479 col. 2 lines 54-72 and col. 3 lines 55-66 bridging col. 4 lines 1-29). It is the Examiner's position that aluminum is a reflective material. In other words, a reflective coating is disposed on the bladder.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the hinge of Kaji et al. by replacing the pivot 128 with an inflatable bladder having sublimation powder inside for inflating the bladder and aluminum layer for reflecting and conducting as taught by A. D. Struble Jr., because it would reduce the weight and be more reliable. (See col. 1 lines 42-48)

Regarding claim 2, as seen in Figure 13, Kaji et al. describe flexible and conductive leads 22 extending from the left panel and around the hinge for electrically

routing power from the left panel. (See '067 col. 8 lines 25-26, col. 8 lines 58-67 bridging col. 9 lines 1-15).

Regarding claims 5-6, as seen in Figure 13, Kaji et al. describe the solar cell unit (121) attached to the hinge (126) by using adhesive layers 1210, and each solar cell unit has a substrate at the bottom and collector electrode on top to support the solar cell. (See col. 7 lines 61-67 bridging col. 8 lines 129). It is the Examiner's position that the substrate and the collecting electrodes together constitute the frame for supporting and securing the left panel to the top film and to the hinge (or pivot 128).

Regarding claim 7, as seen in Figures 12 and 13, Raji et al. describe a flex circuit as addressed in claim 2. Raji et al. also disclose a plurality of ground pads (metal contact – See '067 col. 8 lines 19-20) disposed on the bottom film, a plurality extension comprising conductive traces (leads 122) extending from the flex circuit to the plurality of ground pads. In addition, the location of the ground pads, either on top or bottom films, is obviously a designer choice.

Regarding claim 8, as seen in Figure 13, Raji et al. disclose a flex circuit (122) extending from the left panel and around the hinge for electrically routing power from the left panel, a plurality of ground pads (collector electrodes and metal layer – See col. 8. lines 7-29) disposed on the bottom films and disposed on and under the left and right panels, and a plurality of extensions comprising conductive traces extending from the flex circuit to the plurality of ground pads. The location of the ground pads, either on top or bottom films, is obviously a designer choice.

Regarding claim 9, Raji et al. disclose a flex circuit (122) extending from the left panel and around the hinge for electrically routing power from the left panel, the left panel being a solar cell panel comprising a silver contact (See col. 8 lines 7-29) and a thin film solar cell (See col. 7 lines 61-67). The flex circuit comprises a conductor trace (122) connected the silver contact for routing power from the left panel and around the hinge. (See Figure 13).

12. Claims 10-11 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kaji et al. (US Patent 5701067) in view of A. D. Struble Jr. (US Patent 3277479) and further in view of Dever et al. ("Indium Tin Oxide-Magnesium Fluoride Co-Deposited Films for Spacecraft Applications", International Conference on Metallurgical Coating and Thin Films, August – 1998).

Regarding claims 10-11 and 15, Kaji et al. and A. D. Struble Jr. teach a hinge as described in paragraph 11, wherein Kaji et al. teach having a transparent protective laminate (123) on top and bottom of the hinge for passing UV light.

Neither Kaji et al. nor Struble teach the coating is for conducting static electrical charge and made of indium tin oxide and magnesium fluoride.

Dever et al. teach coating indium tin oxide and magnesium fluoride on the surface of a spacecraft for passing UV light and conducting static electrical charge. (See the Introduction).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the hinge of Kaji et al. and Struble by providing a coating

layer of indium tin oxide and magnesium fluoride as taught by Dever et al., because it would prevent arcing. (See the Conclusion)

13. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kaji et al. (US Patent 5701067) in view of A. D. Struble Jr. (US Patent 3277479) and further in view of Minahan et al. (US Patent 4610077).

Kaji et al. and A. D. Struble Jr. disclose a hinge as described in paragraph 11.

Neither Kaji et al. nor A. D. Struble Jr. teach a wrap around contact.

Minahan et al. teach using a solar cell having a wrap around contact. (See the Abstract and Figure 1k of Minahan et al.)

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device of Kaji et al. and A. D. Struble Jr. by providing a wrap around contact as taught by Minahan et al., because it would improve surface efficiency. (See '077 col. 1 lines 41-63)

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanh-Truc Trinh whose telephone number is 571-272-6594. The examiner can normally be reached on 8:30 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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